Prevention and Control of Anemia: Thailand Experiences\textsuperscript{1,2,3}

Pattanee Winichagoon\textsuperscript{4}

Institute of Nutrition, Mahidol University, Salaya, Nakhon, Pathom 73170 Thailand

ABSTRACT Thailand has addressed nutrition in national development policy since the mid-1970s, including efforts to reduce iron deficiency anemia. Nutritional improvement has been implemented as an integral part of primary health care and community development extending beyond government services to include community participation. Utilization of village health volunteers has been a crucial feature of the program. Available data indicate that anemia rates have declined among pregnant women and preschool children, although there has been no formal evaluation of the program effect. Universal iron supplementation has been the major strategy for pregnant women, using village health volunteers to encourage continuation of the antenatal care schedule and encouraging a preventive approach by health service providers. Program obstacles have included lack of access to iron tablets by some populations and lack of understanding of the importance of anemia. Women’s compliance was complicated by fear of having a large fetus, forgetfulness and side effects. Weekly iron supplementation of school children was piloted in 2000, and is now being extended. Other strategies utilized to address iron deficiency include food fortification, dietary improvement and complementary public health measures. Program monitoring and evaluation require strengthening to assess the effectiveness of intervention strategies and provide proper data for decision-making.


KEY WORDS: • iron deficiency anemia • pregnant women • school-age children • iron fortification • Thailand

This paper presents Thailand’s experiences in the prevention and control of iron deficiency anemia (IDA).\textsuperscript{1} Thailand has addressed nutrition in its national development policy since the mid-1970s, and IDA was included in the national goal. Nutritional improvement in Thailand has been implemented as an integral part of primary health care and community development with the aim of improving food and nutrition security at the household level. This provides an important infrastructure that has extended beyond government services to include community participation.

Anemia trends in the Thai population

The prevalence of anemia in pregnant women in Thailand has declined substantially between the 1980s and 1990s, as indicated by results from the 3rd and 4th Thailand National Nutrition Surveys (Fig. 1) (1,2). The prevalence of anemia among lactating women, however, has remained unchanged during the same period. Despite limited data for children <5 y of age, comparison of the two national surveys shows a reduction in the prevalence of anemia from 41 to 25%. Recent evidence of a possible high prevalence of anemia in infancy is of concern. Based on the WHO cut-off value for hemoglobin (<11 g/dL), the prevalence of anemia in young infants (4–6 mo of age) in small survey areas was found to be as high as 32 and 62%, despite fairly proper growth (Winichagoon, P., unpublished data, April 1997, July 1998–April 1999). In addition to national survey data, the prevalence of anemia among pregnant women and school-age children has been reported through the routine health information systems\textsuperscript{6} since 1988 (3) (Fig. 2). These reports also indicate declining trends in anemia prevalence in both groups. A small increase was observed in the prevalence among pregnant women around 1998, which coincided with Thailand’s economic crisis.

Policy on prevention and control of anemia in Thailand

Table 1 summarizes the goals on anemia included in Thailand’s National Food and Nutrition Policy since the 1980s.

\begin{itemize}
\item Anemia surveillance for pregnant women mainly included women attending ANC at secondary hospitals and some at health centers due to limited facility for measuring hematocrit. It is possible that women residing in farther rural areas are not measured by this system. Underestimation of prevalence is possible.
\end{itemize}
The first notable goal was to eradicate anemia among pregnant and lactating women. This goal was later modified to include school children. The new goal specified a certain percentage reduction in the prevalence of anemia among both pregnant women and school children (Table 1). The community-based nutrition program, which has been an integral part of primary health care (PHC), was in charge of implementation of this policy. The specific strategy on IDA was confined almost solely to pregnant women and school children.

Before the establishment of PHC, several maternal and child services reached only ~30% of the population (4). The referral system was poor because well equipped secondary hospitals were situated only in the provincial level, and were difficult to access from rural communities. Primary Health Care in Thailand was launched in the late 1970s and became established by the first half of the 1980s. District hospitals were expanded and were linked to work with the existing public health system (health centers) at the peripheries.

A crucial element of PHC lies in its creation of village-based health volunteers and their efforts to reach the villagers with the health services. Volunteers were selected by the community, trained on essential health knowledge and assigned specific preventive and promotive tasks with a focus on maternal and child health and nutrition. Activities include growth monitoring, diarrhea management using oral rehydration therapy (ORT), identifying pregnant women and encouraging them to attend antenatal care services (5).

![FIGURE 1](image1.png)

**FIGURE 1** Prevalence of anemia by region among pregnant and lactating women from the 3rd and 4th National Nutrition Surveys (NNS).

<table>
<thead>
<tr>
<th>National development plan</th>
<th>Goals on anemia in NFNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th NESDP (1977–1981)</td>
<td>None (focused on PEM in young children)</td>
</tr>
<tr>
<td>5th NESDP (1982–1986)</td>
<td>Eradicate anemia among pregnant and lactating women</td>
</tr>
<tr>
<td>6th NESDP (1987–1991)</td>
<td>Reduce prevalence of anemia among pregnant women and school children to &lt;20%</td>
</tr>
<tr>
<td>7th NESDP (1992–1996)</td>
<td>Reduce prevalence of anemia among pregnant women and school children to &lt;10%</td>
</tr>
<tr>
<td>8th NESDP (1997–2001)</td>
<td>Reduce prevalence of anemia among pregnant women and school children to &lt;10%</td>
</tr>
</tbody>
</table>

| NESDP, National Economic and Social Development Plan; PEM, protein-energy malnutrition. |

**Implementation of the prevention and control of anemia program for pregnant women, antenatal care (ANC) services and role of primary health care volunteers**

Village health volunteers (VHV), the key manpower in PHC, have played a pivotal role in identifying and encouraging pregnant women to attend ANC services. This has increased the coverage of pregnant women attending ANC significantly, since the 1980s. Universal iron supplementation is an integral component of the ANC, which is being provided by midwives at health centers (primary care unit) or nurses at the hospitals (secondary/tertiary care units). The improved referral system could be the main factor that encourages pregnant women to comply with prenatal services. Pregnant women are expected to attend ANC at least once during each of the first and second trimesters, and twice during the third trimester. The recommended schedule is monthly until mo 8 of gestation, then twice monthly and weekly as childbirth draws near. By the late 1990s, most births occurred in hospitals in most parts of the country, with relatively lower coverage in some southern provinces and mountainous areas of the north and west (4). Improved access to health centers or district hospital was also a result of improved transportation from villages to subdistrict and district facilities.

**Iron tablet distribution.** Iron tablets (60 mg dose) are dispensed along with multivitamin mineral tablets monthly or bimonthly, according to ANC schedules. In each fiscal year, the central division in the Ministry of Public Health (MOPH) sets aside funds for iron tablets. The amount required is estimated from the prevalence of anemia and the potential number of pregnant women and children. Because prevention of anemia has been made a national policy, and the tablet cost is relatively low, in practice, iron tablets have also been purchased by using income generated at each health service unit to replenish the inventory when there is any shortfall of supply. District hospitals generally can also support the peripheral health facility when the need arises. Thus, scarcity of iron tablet supplies has not been a major problem.

**Compliance with iron supplementation.** Important barriers to prevention and control of IDA among pregnant women are found among both service providers and pregnant women (Fig. 3). Among service providers, anemia is not perceived to have health significance and a perception of its public health

![FIGURE 2](image2.png)

**FIGURE 2** Prevalence and trends of anemia among pregnant women and school children from anemia surveillance system.
significance is lacking. Anemia is seen as a common symptom observed in clinical practice and its cure is seen as achieved simply by prescribing iron tablets for a few months. This perception was extended to the pregnancy period because it is commonly known that anemia is likely as pregnancy progresses. Prevention of anemia by iron supplementation is not considered necessary, despite the policy to dispense iron tablets for prophylactic purpose. Furthermore, the discontinuation of iron supplementation was related to the inability of service providers to follow up with pregnant women who missed ANC scheduled visits (6).

Among pregnant women, fear of having a large fetus, forgetfulness and side effects were important reasons for low compliance with iron supplementation (6,7). Side effects, although an important cause of termination of iron supplementation (8) may, in fact, be overemphasized as the reason for poor compliance. Fear of having a large fetus could potentially be more problematic in communities in which childbirth still occurs at home, whether by tradition or inaccessibility to a health facility. This appears to be the case in rural communities in Thailand as reported in the efficacy trial conducted 1978–1979 (9). In addition, forgetfulness was more frequently found to be a cause of noncompliance in the effectiveness study (6,7). In both studies, effective compliance could be achieved if messages regarding the importance of iron on functions and development, and specifics on iron tablets (dose, frequency and anticipated side effects) were provided. Winichagoon et al. (7) also reported that among women who reported having side effects, those with prior knowledge of this outcome continued the supplementation. If access to a health center is difficult, VHV operated drug funds in the community can serve as an acceptable outlet for supply of iron tablets. In the large-scale program, the VHV made an important contribution by motivating pregnant women to initiate and continually use the ANC services (Fig. 4).

**Evaluation of program effect.** To date, there has been no evaluation of the effect of anemia policies and programs in Thailand. Although anemia surveillance has been established in the health information system since 1988, the data included mainly women attending hospital ANC, and are thus likely to reflect the status of women living in towns more than women living in rural areas. Also, the hematocrit measurement taken at the first ANC visit may not reflect the program’s performance because the hematocrit measured in early pregnancy more likely reflects the status before pregnancy. Moreover, there is likely to be a bias associated with women attending hospital ANC, as opposed to those attending health centers more at the periphery. Thus, the decline in prevalence as reported by the routine health system may not adequately represent the effectiveness of the anemia prevention and control program for pregnant women. Moreover, there exist some data on hematocrit that were taken before delivery. These data, although not representative of the pregnant population, are potentially useful for assessing program performance until a better evaluation design is implemented.

**Prevention and control of anemia among school children**

Health personnel at the district hospital or subdistrict health center level have worked closely with primary school teachers in the catchment area to screen school children for anemia. This screening has been limited to facilities in which hematocrit is available. Anemic children were then followed by joint efforts between health personnel and the schoolteachers. However, this is a curative rather than a preventive strategy.

**Surveillance system in the prevention and control of Anemia in Thailand**

A routine health reporting system collecting hematocrit data of pregnant women and school children has been established with the intention of monitoring the anemia situation. Results are shown in Figure 2. Some limitations of this system have been previously mentioned. The current surveillance system should be reviewed to assess how well it meets the purposes for which it is intended. Due to possible bias in collecting data from the routine health system, a national representative sample survey may be conducted periodically with inclusion of other important groups, namely, infants, young children and adolescents.
Other strategies currently being implemented

Weekly iron supplementation. Recognizing the need of a program for school children, weekly iron supplementation is now included in the school health package, mainly in the “health promoting schools” program, and for child-bearing age women, especially in the work place. In the year 2000, weekly iron supplementation was launched as a pilot program in schools in 13 provinces and is being extended throughout the country in 2001 (Department of Health, MOPH, personal communication, 2001). Currently, the supplementation is being provided only from the government’s budget. Extending weekly iron supplementation programs to various age groups will require a shift from government dependency to inclusion of the private sector through use of a marketing strategy and a community support scheme.

Iron fortification. Partnership with industry has been successful in implementing triple-fortified instant noodles in the market (10). This was a collaboration among academia and the public and the private sectors. Instant noodles were identified as a potential vehicle for fortification due to high consumption (six million packages sold per day) and wide distribution through the various outlets throughout the country. At about 5 baht/pack (about US$ 0.10), the poor can afford to buy the noodles. The next step was to develop the fortification process and to promote its use among the population at risk of micronutrient deficiency. Product development was done jointly by researchers at the Institute of Nutrition, Mahidol University (INMU), with involvement of industry, which provided food processing facilities. This fortified noodle product contains about one third the Recommended Dietary Allowance for vitamin A (267 μg retinol equivalents), iodine (50 μg) and iron (5 mg). The fortificants were put in the soup base included in the noodle package. Acceptability and stability of the fortified product, with a range of flavors, were tested and the product has now been launched commercially. The bioavailability or efficacy of this product, however, has not been tested.

Another product, which has been similarly studied and implemented, is the double-fortified (iron and iodine) fish sauce (Chavasit, C., personal communication, 2001). Fish sauce is a common condiment in Thai households. It may be used during cooking or put directly into food like table salt. The double-fortified product is ready to be launched in the market and studies of its bioavailability are being planned.

Food based strategy. Thai eating patterns are largely plant based, with rice contributing as much as 60–70% of total daily energy intake. The proportion of nonheme iron is higher than heme iron, especially in rural Thai diets, and iron absorption from Thai meals is presumed to be low (11–13). In addition, there are several indigenous vegetables that are commonly consumed. Some vegetables have been shown to strongly inhibit iron absorption (14). To date, there are limited data on enhancers and inhibitors of iron absorption in Thai foods. Therefore, development of a food based strategy, particularly improving habitual diets, requires more information about meal consumption patterns and food constituents in local or indigenous food sources that may modify iron bioavailability.

Other complementary strategies. In the health program, plans for deworming for children, thalassemia and malaria eradication have already been developed. These programs can be integrated better to address anemia.

Accomplishments

Anemia has been addressed in the Thailand national nutrition policy for two target populations, i.e., pregnant women and school children. Universal iron supplementation has been the major strategy for pregnant women, implemented as part of antenatal care in the health system. Program improvement lies in expanding the efforts of village health volunteers to encourage continuation of the ANC schedule and in encouraging health service providers to orient their practices more toward preventive measures. Iron tablet supply has not been as important a program obstacle as other factors such as access to iron tablets, lack of understanding and the attitudes of service providers and pregnant women toward iron supplementation. Compliance has been complicated by the perceptions of pregnant women, including fear of having a large fetus (which causes difficult delivery), forgetfulness to take iron tablets regularly and side effects.

Challenges and recommendations

Promoting the importance of iron in functions throughout the life cycle is pivotal to increasing awareness and advocating sustainable actions to prevent IDA in all age/gender groups. The current program is focused on iron supplementation. The program strategy will have to be redefined to be more comprehensive and include strategies for women of reproductive age, infants, young children and adolescents. Food fortification is promising, particularly if the food vehicles utilized can be those already in the habitual diets of the population. The two products that have already been launched with the joint efforts of public, private and academic sectors, comprise a model for further development and promotion of fortified foods to address iron deficiency and anemia for all age groups. Bioavailability and/or efficacy tests of the fortified products will be important in guiding policy on these products. Although food-based strategies should be the best in the long term, their limitations are well recognized given the current habitual Thai dietary habits and patterns. Strengthening of both program monitoring and evaluation is required to generate proper data for decision makers, in terms of both policy and program improvement, and to assess the effectiveness of intervention strategies.

Acknowledgments

I would like to thank Rae Galloway from World Bank for her technical input and Tippawan Pongcharoen for her assistance in preparation of the figures and administrative support.

LITERATURE CITED


